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DISCUSSION AND CORRESPONDENCE.

'STRATIGRAPHY VERSUS PALEONTOLOGY IN NOVA SCOTIA.'

TO THE EDITOR OF SCIENCE: May I ask your space for a few words in reply to remarks by my friend Mr. David White on 'Stratigraphy versus Paleontology in Nova Scotia' (SCIENCE, August, 1902, page 232).

While I cannot pretend to the wide and varied acquaintance with the Paleozoic flora which he possesses, I may have a closer local knowledge of the conditions attending the occurrence of the floras that form the subject of his communication, than he has, and so be in a position to offer some suggestions that may have value in deciding the age of these floras.

I fully agree with him, however, in saying that a more thorough study of the paleontological question is desirable; but not in his claim that this will settle the question of age—*unless the stratigraphy is considered as well*.

As attention has lately been called to the remarkable resemblance of the fossil floras in certain basins in Nova Scotia and New Brunswick to those of the Coal Measures, and to each other, and arguments deduced from the Nova Scotia organic remains are applied to those in the neighboring province in assigning their age, we should not forget that there are very considerable differences both lithological and paleontological in the two districts and overlooking these tends to 'confuse the issue.'

The Nova Scotia deposits may or may not be of the same age as those in New Brunswick, but until there is a full agreement that they are contemporaneous, it seems unwise to apply arguments deduced from the former to fix the age of the latter. The basins are 150 to 200 miles apart.

At page 232 Mr. White gives a list of about a dozen reptiles, crustaceans and molluscs found in the Nova Scotian beds, which he claims are Carboniferous types. *Not one of these* except the worm, *Spirorbis eriensis*, has been found in the New Brunswick beds, and yet they are used (page 235) to show that the latter beds are Carboniferous. If Mr. White will reread my article to which he re-

fers at page 234, he will find that it is based entirely on the New Brunswick beds, the flora of which was first described; and to which those of the neighboring province of Nova Scotia were referred, by Messrs. Fletcher and Ells, as to a standard.

Now if we take the evidence of the fauna actually found in the New Brunswick beds we find that it cuts the opposite way from that cited by Mr. White from the Nova Scotian beds. Of numerous insects and myriapods found in the New Brunswick (St. John) plant beds *none* are known in the Carboniferous. Of the forms referred to the Crustacea *all* are different from the Carboniferous forms, and the genera also differ. The two land molluscs are *unknown* in the Carboniferous.

That Carboniferous types of plants should be found as low down as the Devonian need not create surprise. Has not Walcott found Devonian fishes in the Silurian, and Silurian corals in the Ordovician?

We await the discovery in other parts of the world of plants in pre-Carboniferous strata which shall sustain Sir William Dawson's reference of the St. John plant beds to the Devonian, certainly the latest system to which they can be assigned. When Mr. White or some other geologist shall find in the wide domain of the United States, or some other part of the world, a Devonian or Silurian *lagoon* and *marsh* deposit, with plants, insects, myriapods, isopods, etc., of quite different type from those of the St. John plant beds, then we may consider whether the Canadian paleophytologists and stratigraphers have been at fault.

Mr. White refers, at page 235, to the 'thoroughly studied magnificent section of Devonian near the Gulf of St. Lawrence' as having no signs of 'the extraordinary paleontological anomaly' of the St. John plant beds. I fear that in this case he has not considered the importance of *habitat* in modifying the distribution of plants. Presuming that in the reference to a Devonian section he alludes to that at the head of the Baie Chaleur, the comparison is quite out of place; that was a lacustrine and estuarine deposit with fishes, etc., and some plants. It cannot be too

strongly stated that the plant remains at St. John are numerous and are in a marsh and lagoon deposit. The ecological conditions were different, and so are the plants. The Baie Chaleur beds hold very few species for comparison, and it is not surprising that most are different.

There is no 'isolated Carboniferous molluscan fauna' in the St. John plant beds, and to them therefore Mr. White's argument from this fauna does not apply.

As regards the *Megalopteris* argument, it has to my mind as much force now as before Mr. White's statement in this article that the genus is known to be only as old as the Pottsville. Professor Andrews shows it to have been only twenty or thirty feet above the lower Carboniferous limestone; and it did not spring, like Minerva, ready armed and helmed from the brain of Jove, *i. e.*, it had closely related ancestors of earlier date. And that author described several species, none of which is identical with Hartt's species of the St. John beds.

But, after all, paleontology must bow to stratigraphy, and until it can be shown that the geological structure at St. John has been wholly misunderstood and misinterpreted, this supposed anomaly of plants, generally considered as Carboniferous, occurring in beds as old at least as the Devonian Age, must remain.

G. F. MATTHEW.

ST. JOHN, N. B.,

September 11, 1902.

EVIDENCE OF RECENT ELEVATION OF THE GULF
COAST ALONG THE WESTWARD EXTENSION
OF FLORIDA.

TO THE EDITOR OF SCIENCE: During the spring of the present year, while doing field work along the Gulf shore south of Tallahassee, Fla., I obtained some facts which seem to show perceptible elevation of the coast in that vicinity within the memory of man. The data upon which the following remarks are based were furnished by Mr. J. L. Oliver, of Wakulla, Florida.

At St. Marks, Wakulla Co., Fla., is an old store or warehouse formerly occupied by a Mr. Harrell. This old house is built on piles,

and in the 'fifties' there was an old field with a little pond in it just north of the house. During the 'fifties,' except at neap tide, the water at high tide passed under this house and into the pond. Since that time the pond has been drained, so that now rain water never stands in it, and its present connection with the tides is less obstructed than in the 'fifties,' but, notwithstanding this, the water at spring tide no longer comes under the house or reaches the old site of the pond unless a strong southeast or south wind has been blowing for two or more days.

A neap tide overflows the banks of the St. Marks River only in low places, and an average tide will lack three hundred yards of reaching where the pond was. Brush is taking portions of the marsh, where it had never been known to grow before.

Mr. Oliver's estimate is that the land has been elevated from one foot to eighteen inches since the 'fifties.' At first I thought that filling in with sediment might cause the change of level, but that does not seem probable. Therefore, if this evidence is trustworthy, the Gulf coast in the vicinity of St. Marks, Fla., is rising at the rate of two to three feet per century.

These notes seem interesting, and it is hoped that they may incite others to make observations, or even lead to some attempts by establishing bench marks to measure the rate of change of level.

T. WAYLAND VAUGHAN.

SMITHSONIAN INSTITUTION,
WASHINGTON, D. C.,
September 11, 1902.

THE STRENGTH OF ANTS.

TO THE EDITOR OF SCIENCE: While walking on the university campus the other day, my attention was arrested by what appeared to be a grasshopper moving along the sidewalk without using his hind legs. Upon closer examination, I saw that the grasshopper was dead and was being dragged along by a small ant.

The difference between the size of the little laborer and his load was so extraordinary that I thought it might be of interest to know the exact weight of each. I accordingly weighed